N92-12880

Near Infrared Imaging of the Outer Planets . . . . . K. Matthews
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In the last year we have continued our program of near infrared imaging of the outer planets of the solar system. Images of the giant planets in the near infrared, particularly near 2.3 μm, are exceedingly sensitive to the presence of miniscule quantities of aerosols in the very highest (lowest pressure) portions of the atmospheres because the strong methane absorption of the scattered sunlight strongly suppresses light scattered from lower down in the atmosphere. This feature also permits us to search for very faint objects close to the planetary disk, objects that would not be visible otherwise because of the strong scattered light component from the nearby planet.

Uranus is virtually invisible at 2.3 μm, showing that the methane is an effective absorber of the incident sunlight and that there is very little aerosol content in the upper atmosphere. On the other hand, Neptune shows a haze present over the entire northern hemisphere at 2.3 μm. This leads to the inference that there is an aerosol layer at a high altitude.

We have recovered the Neptune satellite 1989 N1, which was first discovered in Voyager images. The satellite is exceedingly faint in the near infrared, and was detectable only because the planet itself was comparatively faint at this wavelength. Observations of this satellite, coupled with the Voyager images, permit us to substantially refine the satellite's orbit, and hence carefully probe the gravitational field of Neptune.